

WHAT IS CLAIMED IS:

5 1. A method of manufacturing a semiconductor device in which a semiconductor element is formed in a semiconductor substrate, including a step of selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of a target substrate including a semiconductor substrate.

10 2. The method of manufacturing a semiconductor device according to claim 1, wherein the step of selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate is carried out after a step of forming an uneven portion in the target substrate.

15 3. The method of manufacturing a semiconductor device according to claim 1, wherein the step of selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate is carried out after at least one additional step following a step of forming an uneven portion in the target substrate.

20 4. The method of manufacturing a semiconductor device according to claim 1, wherein the step of selectively grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the target substrate is carried out after

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5            5. The method of manufacturing a semiconductor  
device according to claim 1, wherein the step of  
selectively grinding or polishing the peripheral  
portion and the beveled portion on the side of the main  
surface of the target substrate is carried out after a  
0            step of forming a film of a material providing a source  
of contamination of the processing machine for applying  
a predetermined processing to the target substrate  
including the semiconductor substrate or providing a  
source of contamination of the semiconductor substrate.

applying an anisotropic dry etching treatment to form an uneven portion in a target substrate including a semiconductor substrate; and

25        7. A method of manufacturing a semiconductor device comprising:

a first step of forming an insulating film on a semiconductor substrate;

a second step of applying an anisotropic etching to the insulating film and the semiconductor substrate so as to form a trench in the semiconductor substrate;

5 a third step of depositing a polysilicon film in a manner to cover the main surface of the semiconductor substrate including the inner surface of the trench;

10 a fourth step of grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the semiconductor substrate covered with the polysilicon film; and

a fifth step of polishing the polysilicon film with the insulating film used as a stopper.

15 8. The method of manufacturing a semiconductor device according to claim 7, wherein said trench is used for forming a trench capacitor formed on said semiconductor substrate.

9. The method of manufacturing a semiconductor device according to claim 7, wherein the second step is a dry etching step.

20 10. The method of manufacturing a semiconductor device according to claim 7, wherein the fifth step is a chemical and mechanical polishing step.

25 11. The method of manufacturing a semiconductor device according to claim 7, wherein said insulating film comprises a first insulating film formed on said semiconductor substrate and a second insulating film formed on said first insulating film, and said second

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insulating film is used as a stopper in the step of polishing said polysilicon film.

12. The method of manufacturing a semiconductor device according to claim 11, wherein said first  
5 insulating film is a silicon oxide film, and said second insulating film is a silicon nitride film.

13. A method of manufacturing a semiconductor device, comprising:

10 a first step of forming a first insulating film on a semiconductor substrate;

a second step of etching the first insulating film to form a trench in the first insulating film;

15 a third step of forming a barrier metal layer on the upper surface of the first insulating film and on the inner surface of the trench;

a fourth step of depositing a metal layer in a manner to cover the main surface side of the semiconductor substrate with the barrier metal layer interposed therebetween;

20 a fifth step of grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the semiconductor substrate covered with the metal layer;

25 a sixth step of polishing the first insulating film with the metal layer used as a stopper so as to remove the metal layer and the barrier metal layer on the upper surface of the first insulating film so as to

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19. The method of manufacturing a semiconductor device according to claim 13, wherein said barrier metal includes a TaN film formed by a sputtering method.

20. The method/ of manufacturing a semiconductor

21. A method of manufacturing a semiconductor device, comprising:

selectively etching the insulating film to form  
a trench in the insulating film;

grinding or polishing the peripheral portion and the beveled portion on the side of the main surface of the semiconductor substrate covered with the film containing the contaminant material.

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